

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, comprising the steps of:

5 providing a semiconductor substrate in which a gate electrode pattern is formed; and

forming an interlayer insulating film including a multi-layered oxide film by performing multiple simultaneous deposition-and-etch processes in order to bury the gate electrode pattern.

10 2. The method of manufacturing a semiconductor device according to claim 1, wherein the multiple simultaneous deposition-and-etch process is carried out by performing a depositing and etching process for a HDP oxide film simultaneously.

15 3. The method of manufacturing a semiconductor device according to claim 1, wherein a deposition-and-etch rate of the oxide film, which is to be deposited and etched, is in the range of 1 to 25, when the multiple simultaneous deposition-and-etch process is carried out.

20 4. The method of manufacturing a semiconductor device according to claim 1, wherein the interlayer insulating film has a surface refractive index of 1.44 to 1.48.

5. The method of manufacturing a semiconductor device according to

claim 1, wherein the etch process is carried out by using a plasma sputtering.

6. A method of manufacturing a semiconductor device, comprising the steps of:

5 providing a semiconductor substrate in which a gate electrode pattern is formed;

forming a first HDP oxide film over the entire structure by performing a first deposition and etch process simultaneously; and

forming a second HDP oxide film over the entire structure by  
10 performing a second deposition and etch process simultaneously.

7. The method of manufacturing a semiconductor device according to claim 6, wherein the etch process is carried out by using a plasma sputtering.

15 8. The method of manufacturing a semiconductor device according to claim 6, wherein a deposition-and-etch rate of the first HDP oxide film is in the range of 3 to 25.

9. The method of manufacturing a semiconductor device according to  
20 claim 6, wherein a deposition-and-etch rate of the second HDP oxide film is in the range of 1 to 3.

10. The method of manufacturing a semiconductor device according to claim 6, wherein the second HDP oxide film has a surface refractive index of 1.44 to 1.48.